REMARKS

The Examiner has rejected claims 1-7, 15, and 21 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner has also rejected claims 1-7, 15, and 21 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification commensurate in scope with theses claims. The Examiner has further rejected Claim 15 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

In addition, the Examiner has rejected claims 1-7, 15, and 21 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 1 of U.S. Patent No. 5,843,454, and Claim 1 of U.S. Patent No. 5,518,723.

Claims 8-14 and 16-20 have been withdrawn. Claims 1-21 are currently pending. The following remarks are considered by applicant to overcome each of the Examiner's outstanding rejections to current claims 1-7, 15, and 21. An early Notice of Allowance is therefore requested.

I. REJECTION OF CLAIMS 1-7, 15, AND 21 UNDER 35 U.S.C. § 112, FIRST PARAGRAPH – WRITTEN DESCRIPTION

On page 2 of the current Office Action, the Examiner rejects claims 1-7, 15, and 21 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed and believed overcome in view of the following discussion.

As stated above, the Application specifically states that:

> "An 'equivalent' of any fragment of CD4 as used herein includes any molecule that mimics the conformation of any fragment of CD4 and which can bind to gp120." Application (as filed), P. 10, Lns. 24-26.

The portion of the specification to which the Examiner cites discusses equivalents of entire CD4 molecules. To better clarify what is meant by an "equivalent thereof" in Claim 1, Claim 1 has been currently amended as discussed above. Accordingly, Applicants assert that Claim 1 is now in allowable form.

In response, the Examiner asserts that the phrase "the conformation of any fragment of CD4" and the phrase "cryptic epitopes" are not conventional in the art or known to one of ordinary skill in the art. As below above, however, this is incorrect. Both the phrase "the conformation of any fragment of CD4" and the phrase "cryptic epitopes" are conventional in the art. Therefore, Applicants respectfully request the Examiner withdraw the assertion that these phrases are not conventional in the art.

Regarding the phrase "the conformation of any fragment of CD4", the only words the Examiner can possibly be asserting are not conventional are "conformation" and "fragment of CD4". However, it is known that proteins fold into one, or more, specific spatial conformations, driven by a number of noncovalent interactions such as hydrogen bonding, ionic interactions, Van der Waals' forces and hydrophobic packing. Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/wiki/Protein_conformation (visited on 3/20/08) (a copy of this article is attached as Appendix A). The "conformation" of proteins is something taught in undergraduate level organic chemistry, and is therefore certainly conventional in the art. Accordingly, it is respectfully asserted that one of ordinary skill in the art would fully understand what "conformation" means in the above phrase. In addition, a "fragment of CD4" is self explanatory, as it is a "fragment" of CD4. Thus, one of ordinary skill in the art would certainly be familiar with this phrase.

Since the both word "conformational" and the phrase "fragment of CD4" are conventional in the art, their combination to form the phrase "the conformation of any fragment of CD4" must certainly be conventional in the art. Therefore, Applicants respectfully request the Examiner withdraw the assertion that the phrase "the conformation of any fragment of CD4" is not conventional in the art.

Similarly the phrase "cryptic epitopes" is also conventional in the art. In particular, a "cryptic epitope", also known as a cryptotope, is known to be an antigenic site or epitope hidden in protein or virion because it is present on the surface subunits that become buried. Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/wiki/Cryptotope (visited on 3/20/08) (a copy of this article is attached as Appendix B). Moreover, a Google search of the phrase "what are cryptic epitopes" yielded about 287,000 results. A copy of the first ten results is attached as Appendix C. Such a widely used phrase must be conventional in the art. Therefore, Applicants respectfully request the Examiner withdraw the assertion that the phrase "cryptic epitopes" is not conventional in the art.

Examiner completely fails to address the above arguments as to why the two phrases "the conformation of any fragment of CD4" and "cryptic epitopes" are not conventional in the art are in fact conventional in the art. Rather, Examiner simply reasserts that the phrases "the conformation of any fragment of CD4" and "cryptic epitopes" are not conventional in the art. However, Applicants have shown, as discussed above, how these two phrases are in fact conventional in the art, and Examiner has failed to rebut these arguments. As such, Examiner's continued assertion that the phrases "the conformation of any fragment of CD4" and "cryptic epitopes" are not conventional in the art without any support is materially deficient.

In addition, Examiner asserts that the specification has not defined what is "the conformation of any fragment of CD4". More specifically, Examiner asserts that a fragment of CD4 could be any pieces of the CD4 molecule from as small as two amino acid residues to as big as the whole CD4 molecule. Examiner asserts that such CD4 fragments have totally different conformations, and that under these conditions the specification has not adequately described what specific conformation the alleged "equivalent of a fragment of CD4" mimics.

However, it is not required that the specification describe every conformation of every fragment of CD4. This is because it is known in the art how to obtain a fragment of a protein. Therefore, all that the current specification need describe is to list the specific protein for

which it is desired to obtain a fragment. The specification has done this by indication that fragments should be taken specifically of CD4.

In addition, once a fragment is taken of a protein, it is known in the art how to obtain the conformation of that protein fragment. As such, the current specification need not describe this. All the specification needs to do is list the specific protein fragment for which it is desired to obtain the conformation. In this regard, the specification specifically states that the fragment of CD4 can include either the first domain of CD4, the second domain of CD4, both the first and second domains, or a combination of the first or second domain of CD4 and the third or fourth domain of CD4. Specification, P. 10, Lns. 18-22. To further clarify claims 1 and 15, both claims have been amended to include this language.

As such, the specification has more than adequately described the conformations of the fragments of CD4 to which the claims relate by describing the specific fragments of CD4.

Therefore, Applicants respectfully assert that Examiner's rejection of claims 1-7, 15, and 21 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, is improper and that claims 1-7 are in allowable form.

II. REJECTION OF CLAIMS 1-7, 15, AND 21 UNDER 35 U.S.C. § 112, FIRST PARAGRAPH – SCOPE OF ENABLEMENT

On pages 3-4 of the current Office Action, the Examiner rejects claims 1-7, 15, and 21 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification commensurate in scope with these claims.

First, this appears to be a description rejection, and not an enablement rejection as initially made in the Office Action of 11/20/06. As such, this rejection is overcome by the above arguments related to the written description as to exactly how the specification describes the language which is present in the Claims.

Second, it should be noted that the original claims are a part of the disclosure. As such, by definition, the disclosure of the Application must be commensurate in scope with the original claims. Claims 2-7 are all in their original form. Therefore, the only claims to which Examiner can possibly be directly referring are claims 1 and 15 (claims 2-7 and 21 being indirectly referred to as being dependent from Claim 1).

In addition, claims 1 and 15 were both amended in the response filed on 8/14/07 to include the claim language below:

> "wherein an equivalent of a fragment of CD4 is any molecule that mimics the conformation of any fragment of CD4 and which can bind to gp120."

This claim language comes directly from the specification:

> "An **'equivalent' of any fragment of CD4** as used herein **includes any molecule that mimics the conformation of any fragment of CD4 and which can bind to gp120.**" Application (as filed), P. 10, Lns. 24-26. (emphasis added).

Furthermore, claims 1 and 15 have also been currently amended to include the claim language below:

> "wherein a fragment of CD4 includes either the first domain of CD4, the second domain of CD4, both the first and second domains of CD4, or a combination of the first or second domain of CD4 and the third or fourth domain of CD4...."

This claim language comes directly from the specification:

> "The fragment of CD4 can alternatively **include either the first domain of CD4, the second domain of CD4, or a combination of the first or second domain of CD4 and the third or fourth domain of CD4.** It is preferable that the fragment of CD4 include wither the first domain of CD4, the second domain of CD4, **or the first and second domains of CD4.**" Application, P. 10, Lns. 18-22. (emphasis added).

As such, the disclosure of the specification is most certainly commensurate with the scope of Claims 1 and 15.

Initially (in the Office Action dated 11/20/06), the Examiner rejected claims 1-7 under 35 U.S.C. § 112, first paragraph, because the specification, while enabling for an

immunogenic complex comprising gp120 bonded to a fragment of CD4, does not reasonably provide enablement for an immunogenic complex comprising gp120 bonded to a CD4 equivalent. This rejection is respectfully traversed and believed overcome in view of the following discussion.

Amended Claim 1 states:

> "An immunogenic complex comprising:
>
> "gp120 covalently bonded to a fragment of CD4 or an equivalent thereof;
>
> "wherein a fragment of CD4 includes either the first domain of CD4, the second domain of CD4, both the first and second domains of CD4, or a combination of the first or second domain of CD4 and the third or fourth domain of CD4; and"
>
> "wherein an equivalent of a fragment of CD4 is any molecule that mimics the conformation of any fragment of CD4 and which can bind to gp120."

The phrase "CD4 equivalent molecules" is described in the specification as including any molecule that mimics CD4 in conformation and/or induces a conformational change on HIV-1 gp120 that is similar to that induced by CD4. Examiner argued that, as a result of this description, neither the instant claims nor the specification provides specific structure description about an equivalent of CD4. However, this claim analysis does not properly identify to what an "equivalent thereof" refers. An "equivalent thereof", as used in Claim 1, refers to an equivalent of a fragment of CD4, not an equivalent of CD4 in its entirety.

To this end, the Application specifically states that:

> "An 'equivalent' of any fragment of CD4 as used herein includes any molecule that mimics the conformation of any fragment of CD4 and which can bind to gp120." Application (as filed), P. 10, Lns. 24-26.

The portion of the specification to which the Examiner cites discusses equivalents of entire CD4 molecules. However, Claim 1 specifically states that the "equivalent" is of a fragment of CD4, and not of the entire CD4 molecule.

In response, the Examiner asserts that the phrase "the conformation of any fragment of CD4" and the phrase "cryptic epitopes" are not conventional in the art or known to one of ordinary skill in the art. This, however, is incorrect.

Regarding the phrase "the conformation of any fragment of CD4", the only words the Examiner can possibly be asserting are not conventional are "conformation" and "fragment of CD4". However, it is known that proteins fold into one, or more, specific spatial conformations, driven by a number of noncovalent interactions such as hydrogen bonding, ionic interactions, Van der Waals' forces and hydrophobic packing. Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/wiki/Protein_conformation (visited on 3/20/08) (a copy of this article is attached as Appendix A). The "conformation" of proteins is something taught in undergraduate level organic chemistry, and is therefore certainly conventional in the art. Accordingly, it is respectfully asserted that one of ordinary skill in the art would fully understand what "conformation" means in the above phrase. In addition, a "fragment of CD4" is self explanatory, as it is a "fragment" of CD4. Thus, one of ordinary skill in the art would certainly be familiar with this phrase.

Since the both word "conformational" and the phrase "fragment of CD4" are conventional in the art, their combination to form the phrase "the conformation of any fragment of CD4" must certainly be conventional in the art. Therefore, Applicants respectfully request the Examiner withdraw the assertion that the phrase "the conformation of any fragment of CD4" is not conventional in the art.

Similarly the phrase "cryptic epitopes" is also conventional in the art. In particular, a "cryptic epitope", also known as a cryptotope, is known to be an antigenic site or epitope hidden in protein or virion because it is present on the surface subunits that become buried. Wikipedia, The Free Encyclopedia, http://en.wikipedia.org/wiki/Cryptotope (visited on 3/20/08) (a copy of this article is attached as Appendix B). Moreover, a Google search of the phrase "what are cryptic epitopes" yielded about 287,000 results. A copy of the first ten results is attached as Appendix C. Such a widely used phrase must be conventional in the art. Therefore,

Applicants respectfully request the Examiner withdraw the assertion that the phrase "cryptic epitopes" is not conventional in the art.

In addition, Examiner asserts that the claims as amended are directed to a vaccine, and that the current specification does not enable an HIV vaccine.

Firstly, not all of the claims are directed to a vaccine. Accordingly, this assertion by the examiner alone is insufficient to support the above rejection of all of claims 1-7, 15, and 21. Secondly, as discussed above, claim 15 is directed only to a "vaccine", and not specifically and "HIV vaccine". Thus, as stated above, the application need not enable an "HIV" vaccine. Also as stated above, vaccines, in general, are enabled in the art. The specification has simply added to that enablement, by describing the components in claim one which may be included in a vaccine. It is sufficient that the Application has enabled simply a vaccine with the components of Claim 15, as this is what is claimed.

Examiner now asserts that the above arguments are irrelevant. In particular, the Examiner argues that while the above appendixes describe the conformation of a protein, they are not descriptive of the specific structural limitation of "the conformation of any fragment of CD4". More specifically, Examiner asserts that, because of the lack of written description of the claimed "an equivalent" in the specification as discussed above, one of ordinary skill in the art would not know how to make alleged gp120-CD4 equivalents. This logic, however, is fatally flawed.

First, what are claimed are not gp120-CD4 equivalents. Rather what is claimed is gp120 bonded to an equivalent of a CD4 fragment. In addition, as discussed above, the phrases "conformation" and "cryptic epitopes" are well understood in the art. As such, they do not need to be described in the current specification in order to enable the invention of claims 1 and 15. In addition, as discussed above, claims 1 and 15 have been amended to specify exactly what is meant by a "fragment of CD4". This definition is supported and enabled by the Specification at page 10, lines 18-22. As such, Applicants respectfully assert that the language of claims 1 and 15 have been both adequately described and enabled by the specification.

Therefore, Applicants respectfully assert that Examiner's rejection of claims 1-7, 15, and 21 under 35 U.S.C. § 112, first paragraph, because the specification, while enabling for an immunogenic complex comprising gp120 bonded to a fragment of CD4, does not reasonably provide enablement for an immunogenic complex comprising gp120 bonded to a CD4 equivalent, is improper and that claims 1-7, 15, and 21 are in allowable form.

III. REJECTION OF CLAIM 15 UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

On page 4 of the current Office Action, the Examiner rejects Claim 15 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. This rejection is respectfully traversed and believed overcome in view of the following discussion.

The Examiner's main issue with Claim 15 seems to be that it is directed to a vaccine. Therefore, claim 15 has been currently amended to be directed to a composition for use in immunotherapy. Such a composition is supported by the Specification, which states that complexes including gp120 bonded to a fragment of CD4 are useful in immunotherapy. Specification, P. 1, ¶ 2 (section cited by Examiner).

As such, Applicants respectfully assert that amended Claim 15 is enabled. Therefore, Applicants respectfully request Examiner remove the rejection of Claim 15 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

IV. REJECTION OF CLAIMS 1-7, 15, AND 21 ON THE GROUND OF NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING

On page 6 of the current Office Action, the Examiner rejects claims 1-7, 15, and 21 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 1 of U.S. Patent No. 5,843,454, and Claim 1 of U.S. Patent No. 5,518,723. This rejection is respectfully traversed and believed overcome in view of the following discussion.

Applicants respectful assert that the above rejections can be eliminated by the filing of a terminal disclaimer and that such a disclaimer need not be filed until the claims are otherwise determined to be allowable by the Examiner. Accordingly, Applicants respectfully reserve the right to file a terminal disclaimer and assert that the 1-7 are otherwise in allowable form.

Based upon the above remarks, Applicant respectfully requests reconsideration of this application and its early allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,

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